

Cryogenic Cooling System for Zero-Venting Storage of Supercritical Air Packs, Phase I

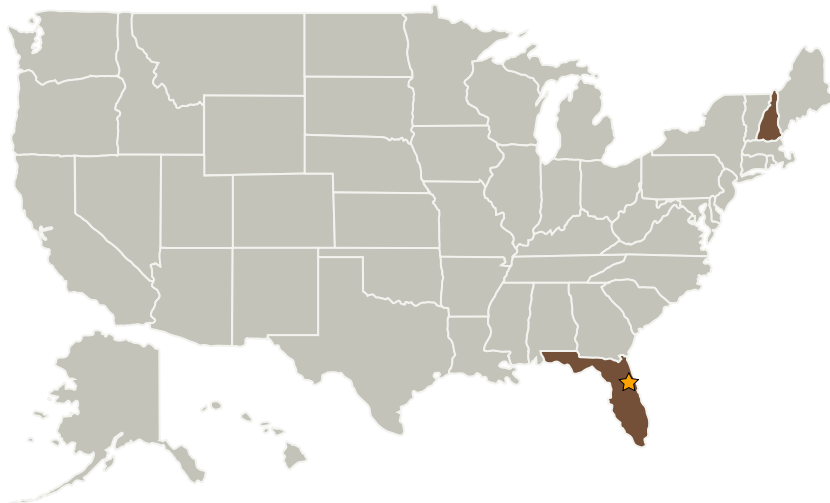
Completed Technology Project (2004 - 2004)



Project Introduction

Supercritical air at cryogenic temperature is an attractive source of breathing air because of its very high density and low pressure. However, heat leak into the cryogenic tank causes the stored air to expand and vent, thus limiting the storage life of a charged system. We propose to develop a storage system for supercritical air tanks that provides cryogenic cooling that will intercept heat leaks to prevent venting and enable long-term storage of charged, supercritical air tanks. The innovative, mechanical cryocooling system provides flexible coupling and quick disconnection from the storage tanks, as well as high reliability and efficient, low-power operation. In addition to storage, the system can be used to charge the tanks with supercritical air without the use of expendable cryogens. In Phase I, we will prove the feasibility of the system through design trade-off and optimization analyses that will produce a conceptual design and operational description of a supercritical air storage system. The system will be designed to store multiple units of NASA's existing supercritical air self-contained breathing apparatus (SCBA) system. In Phase II, we will build and demonstrate a prototype storage system for supercritical air SCBAs.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Creare LLC	Supporting Organization	Industry	Hanover, New Hampshire

Primary U.S. Work Locations	
Florida	New Hampshire

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael Izenson

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.1 In-space Propellant Storage & Utilization